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## AGRICULTURAL EDUCATION: TEXTBOOKS

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One striking evidence of the growing interest in agricultural education in elementary and secondary schools is the number of textbooks on agriculture that have appeared in recent years.<sup>1</sup> Of the seventy-five or more textbooks on this subject nearly forty have been published since 1900.

An excellent account of the textbooks of agriculture, including historical aspects, was written by L. H. Bailey in 1903 (146).<sup>2</sup> The present discussion will therefore be confined chiefly to the textbooks published since 1903. In this period of seven years at least twenty-seven textbooks of various kinds have been written. Emphasis should be put on *various*, for the diversity of plan and treatment of the subject in these books makes it difficult to find a basis of classification. They will be considered in this discussion as three types: for elementary schools, for secondary schools, and for teachers.

Most elementary textbooks are informational in character. The subject is generally presented in clear and simple language easily within the grasp of the pupil. It is assumed that the pupil has had sufficient concrete experiences with agricultural matters, and that the text will help him to interpret these experiences. There is a minimum of effort required of the pupil to find out things for himself. Questions are often given at

<sup>1</sup> It is possible that this statement should be qualified, for the number of books published does not indicate the number in actual use. A quotation from a private letter written by the editor of one of the largest publishing companies of agricultural books is significant: "Outside of one textbook published by a Boston house, I do not believe there is another manual of agriculture or agricultural textbook that has paid the publishers anything beyond mere cost, and some have not even paid cost." This was written in 1909. Since then conditions may have changed for there has been a great development of interest in the subject. Besides, thirteen books have been written during and since 1909. It seems likely that the small demand for certain textbooks may be due to the quality of the books themselves.

<sup>2</sup> References by number are to corresponding numbers in the bibliography at the end of this article, or in bibliographies appended to other articles of this series.

the end of each chapter, but they are usually merely a summary of the text, and test the memory rather than ability to interpret. Sometimes experiments are introduced, either in the text or at the end of chapters. But conclusions to be drawn from these experiments are either so implied in the text or are so obvious that the suggested experiments become merely concrete examples or illustrations of discussion in the text. Books of this kind are easily adapted to the prevailing recitation method and consequently are in extensive use (147). Several books have appeared in which the experiment predominates. Here problems and some suggestions as to procedure are given. The pupil is expected to find answers by means of his own investigations. He is supposed to learn to find out things for himself. However, even in otherwise admirable books, induction is often "ready-made for the pupil" (148). This method of teaching by means of experiment does not fit in very well with prevailing methods of teaching. Many of the teachers themselves have not had the benefit of laboratory training, and hence know very little of any other than the textbook method of learning or teaching.

Another kind is the one in which agriculture is correlated with arithmetic. Problems for demonstration of the various arithmetical principles relate to agricultural affairs. In the preface of one book occurs the statement, "The pupil will unconsciously absorb and retain many valuable facts and principles relating to agricultural practice"; in the preface of another, the statement, "We trust that this little book, by combining the subjects of arithmetic and agriculture, will be of material assistance to teachers in their efforts to do effective work in both branches" (152, 168).

Perhaps one reason for the number of elementary agricultural textbooks lies in the nature of the subject itself.

Considered as an industry, agriculture is manufacturing, buying, and selling. It is business. But unlike most other businesses, the operator is producer of the raw material as well as dealer in the products. In order to produce his wares to the best advantage he must know much of the principles in accordance with which the most successful production must proceed. In other words, he must know much of the sciences on which agriculture is

based, as physics, chemistry, botany, and other sciences. But he should never forget that the practice of agriculture is an art and not a science.

These remarks will suggest why it is that there is such a bewildering diversity in plan in the various textbooks of agriculture. One reason why these textbooks have not been more successful in accomplishing the missions for which they are designed is the fact that they look upon agriculture from the academic point of view rather than from the agricultural. Another reason is the attempt to make them "practical" by inserting specific directions for the performing of accustomed farm operations; for these directions must necessarily be of local and temporary application, whereas principles are general and abiding (146, p. 690).

Considered from the standpoint of scientific accuracy most of these textbooks are good, but in some there are inaccurate data, or statements at variance with well-established facts. Considered from the standpoint of pedagogy most of these texts are lacking. The matter is often presented with little or no reference to this important aspect of a textbook. Indeed, some are barely more than abridged encyclopaedias of agricultural information. This general defect may possibly be accounted for when we consider the fact that the authors of all these books, with a few exceptions, are college professors, whose chief interest is in the subject-matter with apparently little interest in organizing material from a teaching standpoint, and giving no recognition to the social possibilities of their subject.

It is probable that the most useful book, at least for the present, will be one that attempts at the same time to awaken an interest in country life and to set the pupil at the working out of specific problems. Mere problems are too "dry" to attract pupils, except now and then under the inspiration of an extra-good teacher. On the other hand, mere information-giving has little teaching value and is not likely to arouse any important enthusiasm for the open country and the farm. On account of the diversity of interests to be served, no single textbook of agriculture can hope to have great leadership in all parts of the country. The thoroughly satisfactory text is apparently yet to be written (102).

The purpose of an agricultural textbook for secondary schools is well expressed in the preface of a recent book of this grade: "to make the teaching of agriculture in existing high schools comparable in extent and thoroughness with the teaching of physics, mathematics, history, and literature." Although some of the elementary textbooks already referred to are being

used to some extent in high schools there are only five books known to the writer that measure up to the standard just quoted. No two of these follow the same plan of treatment. In one laboratory work largely predominates; in another good laboratory exercises follow each chapter; in another some experiments are suggested in the text and among the questions at the end of the chapters; in two no laboratory exercises are suggested except in a general way in the text (151, 165, 170, 172, 175). These are all well written, and where one is used as a textbook the others could be used to advantage as reference books. For a detailed comparison of these textbooks the bibliography should be consulted.

There are three other books which properly belong among secondary textbooks of agriculture but which do not cover the entire subject. "There are those who believe that when agriculture is fully introduced as a secondary subject, it will consist, as in college, not of one but of several courses, each with its distinct and separate text." One of these is a laboratory manual dealing with soils and crops (173); the other two are textbooks, one dealing with fertility of the soil, the other with plant and animal improvement (159, 171).

A third type includes books for teachers. These books deal with the subject from the standpoint of teaching. Five are for teachers in elementary schools (160, 162, 164, 169, 174), and one is for teachers in secondary schools (126). Not much attention has yet been given to the teaching problems of the subject of agriculture, but they are quite as important as the subject-matter.

Referring to elementary agricultural textbooks, L. H. Bailey says: "Efforts enough have been made, but they have fallen short of anticipations. Before textbooks we need teachers; and we must appeal to the child through his interest in nature rather than technically in the farm" (146, p. 696). Elementary textbooks are not nearly so important as elementary teachers. It is to the new teachers who are to have at least a high-school education that we must look to carry agricultural education into the rural elementary schools. It is for this reason that addi-

tional importance is to be attached to instruction in agriculture and country-life subjects in rural high schools. A good textbook with well-selected experiments, although alone not sufficient, is, nevertheless, quite essential to any general introduction and efficient instruction in these high schools.

As this discussion of textbooks of agriculture is really supplementary to one already made by L. H. Bailey (146), his plan of chronological bibliography, with annotations as to contents, will be followed. The two articles will thus bring the subject up to date.

### BIBLIOGRAPHY

The references included in this bibliography are of two kinds: one general, the other, of textbooks published since 1903. One textbook, published in 1902 but not mentioned by L. H. Bailey, is also included.

146. "Development of the Textbook of Agriculture in North America," L. H. BAILEY, U.S. Department of Agriculture, Office of Experiment Stations, *Annual Report for 1903*, 689-712.

This article is based on a similar contribution to *Book Reviews*, VII (1899), No. 2, 43-53, but is greatly extended. An abridged discussion of this subject by the same author is found in the *Cyclopedia of American Agriculture*, IV (1909), 379-85.

A historical account of the development of the textbook of agriculture in North America is given, and is followed by an annotated chronological bibliography of forty-five titles, including the first textbook (1824) and all others known to the writer at the time of publication (1903).

147. "Textbooks of Agriculture," B. M. DAVIS, *Nature-Study Review*, V (1909), No. 9, 244-48.

Four types of textbooks are briefly discussed. These are illustrated by reviews of seven textbooks.

148. "Some Textbooks for Secondary-School Agriculture," C. H. ROBISON, *Nature-Study Review*, III (1907), No. 6, 180-85.

The article is introduced by a general discussion of the movement for agricultural education, and is followed by a detailed account and criticism of three well-known textbooks representing three distinct types.

149. *The School and Farm*, CHARLES A. EGGERT, Chicago: W. M. Welch & Co. (1902), 279.

The book is divided into six parts: Basis and Conditions of Farming; Field Crops; Animals on the Farm; Forest; Science and Agriculture; Rural Scenery. Each part is divided into chapters, e.g., Part II into Raising and Rotation of Field Crops; Grain Crops, Corn; Grass, Clover, and Hay; Root Crops, Potatoes; Value of Different Fertilizers; Silos and Ensilage.

150. *First Principles of Agriculture*, EMMETT S. GOFF and D. D. MAYNE, New York: American Book Co. (1904), 248.

"The first part is based on experiments which may be performed in the school or at home. A summary entitled 'What We Have Learned' has been placed at the close of each chapter. These summaries furnish definite statements for pupils to learn, and may be used by the teacher as a basis for drill work."

There are forty chapters: Dead and Living Matter; Soil and Soil Water; Plant and Water; How Plants Grow; Ideal Soil; Soil Fertility; Humus; Clover; Rotation; Saving Soil Moisture; Plant Parasites; Seeds and Soil Water; Air and Germination; Seed Testing; How Seeds Come Up; Value of Large Seeds; Budding; Transplanting; Plant Improvement; The Flower; Crop and Weeds; Garden Orchard; Insect Destroyers; Animal Husbandry; Dairy Breeds; Beef Breeds; Feeding; Horses; Sheep; Swine; Poultry; Bee-Keeping; Home and School Grounds. There is an Appendix of fifteen pages, including various tables, and also directions for Babcock milk-testing.

151. *Agriculture through the Laboratory and School Garden*, C. R. JACKSON and MRS. L. S. DAUGHERTY, New York: Orange Judd Co. (1905), x+403.

The author's aim is to "present actual experimental work in every phase of the subject possible." Contents: Nature and Formation of the Soil; Classification and Physical Properties of Soils; Soil Moisture and Preparation of the Soil; The Soil as Related to Plants; Leguminous Plants; Principles of Feeding; Rotation of Crops; Milk and Its Care; Propagation of Plants; Improvement of Plants; Enemies of Plants; Ornamentation of Grounds. General References, Agricultural Publications, List of Experiment Stations, Publishing Houses, and Glossary follow. For critical summary of this book see 148.

152. *Elementary Agriculture with Practical Arithmetic*, K. L. HATCH and J. A. HASELWOOD, Chicago: Row, Peterson & Co. (1905), 198.

Each chapter is followed by a set of practical farm problems to be used as exercises for arithmetic class. Contents: Growth of Plants; Plant Water; Plant Foods; Soil; Soil and Crops; Wearing the Soil; Legumes; Drainage; The Crop; Insects; Weeds; Farm Stock; Feeding; The Three C's; Dairy; Poultry; Special Crops; Farm Buildings; Accounts; Forestry; Grounds; School Gardening; Home Gardening; Barn Plan and Ventilation.

153. *Elements of Agriculture*, J. H. SHEPPERD and J. C. McDOWELL, St. Paul: Webb Publishing Co. (1905), 254.

This book is intended especially for use in the Northwestern states. "The course of study follows the seasons: the work on farm crops coming in the fall, that on domestic animals in the winter, and the work on soils and the beautifying of the home and school grounds forms a large part of the course during the spring months."

154. *The First Book of Farming*, CHARLES L. GOODRICH, New York: Doubleday, Page & Co. (1905), xx+259.

The subject is developed by means of experiments as follows: Roots; Soils; Relation of Soils to Water; Forms of Soil Water; Loss of Soil

Water; Soil Temperature; Plant Food in the Soil; Seeds; Seed Planting; Spading and Plowing; Harrowing and Rolling; Leaves; Stems; Flowers; A Fertile Soil; Soil Water; After Cultivation of Crops; Farm Manures; Commercial Fertilizers; Rotation of Crops; Farm Drainage.

155. *Agriculture: Its Fundamental Principles*, ANDREW M. SOULE and EDNA LEE TURPIN, Richmond, Va.: B. F. Johnson Pub. Co. (1907), 320.

"The aim of this book is so to state the scientific facts and principles which underlie the processes of agriculture that they will be intelligible and interesting to young people." Contents: The Soil; The Plant; Soil Improvement; Field, Orchard and Garden Crops; Crop Enemies and Friends; Domestic Animals; Miscellaneous, Including Trees, Tools, Roads, School Gardens, etc. An Appendix giving tables, references, etc., is included.

156. *Rural School Agriculture*, CHARLES W. DAVIS, New York: Orange Judd Co. (1907), vii+267.

"This book is a manual of exercises covering many phases of agriculture" as follows: Plants; Soils and Fertilizers; Corn; Wheat and Oats; Cotton; Feeds and Feeding; Milk; Fruits; Home Grounds; Insects; Spraying. There is a Glossary and an Appendix of useful tables.

157. *Agriculture for Southern Schools*, J. F. DUGGAR, New York: Macmillan (1908), 355.

As the title indicates, this book is intended especially for southern schools, the adaptation being the use of the best practices and materials of southern agriculture for illustration.

The first part of the book deals with plant growth, including the plant's relation to the soil. The second part deals with crops, including enemies (the cotton boll-weevil receiving particular attention), animal husbandry, farm machinery. Important reference tables are arranged in an Appendix.

158. *Elements of Agriculture*, W. C. WELBORN, New York: Macmillan (1908), xvi+359.

This book is prepared for use in southern and western elementary schools. Three phases of the subject are taken up as follows: Crop Production, including the plant and its environment, characteristics of various field crops, soil fertility, etc.; Special Crops, in which the management of each crop is described in detail; Animal Production, including feeding and ration, care of animals, various kinds of farm animals in detail. An Appendix gives a classification of the most common economic plants, plant diseases, and insect enemies of plants and their remedies, score cards for judging, and a Glossary.

159. *First Principles of Soil Fertility*, ALFRED VIVIAN, New York: Orange Judd Co. (1908), 265.

The book is intended for home reading as well as for school use. It is divided into four parts: Plant Food, Its Nature and Source; Making Potential Plant Food Available; Barnyard Manure; Commercial Fertilizers.

160. *Manual of Agriculture for the Common Schools of Illinois*, D. O. BARTO, New York: Appleton & Co. (1908), 52.

"The writer has tried to outline in this little guide sets of studies and exercises in agriculture on topics of general importance and interest to



farmers in all sections of Illinois." The "sets of exercises" are as follows: What Is a Soil? Water; Demands on Water Supply of the Soil; Saving the Soil Water; Effect of Color on Temperature of Soils; Plant and Essentials of Plant Production; Seed; Testing the Seed; Importance of Fine Tilth; Seed Planting; Roots; Root Tubercles; Inoculating the Soil; Plot Experiments; How Necessary Fertilizers Can Be Obtained; Care of Plot Experiments in Vacation; Studies in Corn; Pollination. Two pages of references are given.

161. *One Hundred Lessons in Elementary Agriculture*, A. W. NOLAN, Morgantown, W.Va.: Acme Publishing Co. (1908).

The wide range of topics included in the hundred lessons touches all important phases of agricultural problems. Soils, seeds, gardens, trees, crops, insects, weeds, poultry, foods, birds, machinery, rural civics, and economics—these suggested by titles of prominent lessons—indicate the scope of the book. Much of it is nature-study with agricultural materials and some of it is strictly the technical aspect of the science of agriculture.

162. *Teachers' Manual of Elementary Agriculture, Nature-Study, and Domestic Science*, F. E. THOMPSON, T. S. PARSONS, et al., Boston: Ginn & Co. (1908).

This manual was prepared under the direction of the Colorado Teachers' Association. After an introduction dealing with the educational aspects of the subject follow chapters on Soils, Plant Life, School Gardening and Improving School Grounds, Field Crops, Insects and Birds, Live Stock, and Domestic Science. Five pages are devoted to a Bibliography for agriculture and nature-study work.

163. *Agriculture for Common Schools*, MARTIN L. FISHER and FASSETT A. COTTON, New York: Scribner (1909), xxiii+381.

The book is divided into five sections as follows: I, Soils; II, Farm Crops; III, Horticulture; IV, Animal Husbandry; V, Dairying. There are several appendices. One of these deals with the teaching of the subject with special reference to correlation with reading, arithmetic, geography, etc.

164. *Agriculture in the Public Schools*, LESTER S. IVINS, Lebanon, O.: March Bros. (1909), 156.

This is a handbook for teachers. It includes suggestions for organization of rural schools, teaching of nature-study and agriculture in rural schools, plans for conducting parents' meetings, public displays of school work, corn, potato, and vegetable growing contests, home, rural, and city-school flower gardens, and other valuable information that is intended to be helpful to the teacher.

165. *Elements of Agriculture*, G. F. WARREN, New York: Macmillan (1909), xxiv+434.

"This book is intended for use in high schools, academies, and normal schools, and in colleges when only a short time can be given to the subject." The author has attempted to carry out the suggestions of the Committee on Instruction in Agriculture of the Association of American Colleges and Experiment Stations. All important phases of agriculture are discussed

in the eighteen chapters that make up the body of the book. The text of each chapter is followed by questions, laboratory exercises, and collateral reading. A summary of chap. v, "The Soil," will illustrate the method of treatment which is typical of each chapter: What Soil Is; Rock Particles of the Soil; Soil Water, Including Irrigation and Drainage; Soil Air; Organic Matter of the Soil; Life in the Soil. The chapter is reviewed by means of twenty-four questions. The following is typical: "Where does a fence post rot most rapidly? Why?" Fifteen excellent laboratory and field exercises give concreteness to the text. Ten references are given in the collateral reading. There are twenty pages of appendix containing information useful to teacher and pupil.

166. *Elementary Principles of Agriculture*, A. M. FERGUSON and L. L. LEWIS, Sherman, Tex.: Ferguson Publishing Co. (1909), xvi+318.

The aim of the book is perhaps best expressed by the authors: "Our own ideas are that the primary object of a text on agriculture, intended for the common schools, is to satisfy the natural interest of all children about the *whys* of common farm conditions."

The book is in three parts: Part I deals with the plant, soil diseases of plants, injurious insects, etc.; Part II, with animals, including dairying; Part III is devoted to special topics, such as home lot, school gardens, forestry, etc. There is an Appendix of nine parts, including references, formulae for sprays, tables of nutrients, rainfall, etc.

167. *Practical Agriculture*, JOHN W. WILKINSON, New York: American Book Co. (1909), 383.

This is a "brief treatise on agriculture, horticulture, forestry, stock feeding, animal husbandry, and road building." These subjects are discussed in forty-five chapters. In the Appendix of twenty-two pages are found useful tables and references, and a list of apparatus needed for conducting laboratory courses in agriculture.

168. *A Practical Arithmetic*, F. L. STEVENS, TAIT, BUTLER, and MRS. F. L. STEVENS, New York: Scribner (1909), ix+386.

In addition to the usual aims sought in arithmetic tests, the authors have included "teaching valuable facts by basing the problems of the book upon problems of real life." The book contains a good collection of interesting and valuable applications of arithmetic to the affairs of farm life. Instead of the hypothetical problems concerning what A and B did, occur such problems as, "If kainit contains  $12\frac{1}{2}$  per cent potash and muriate of potash contains 50 per cent potash, how many pounds of kainit will it take to supply as much potash as 40 pounds of murate of potash?"

169. *Practical Nature-Study and Elementary Agriculture*, JOHN M. COULTER, JOHN G. COULTER, and ALICE JEAN PATTERSON, New York: Appleton & Co. (1909), ix+354.

This is a manual for use of teachers and normal students. It is divided into four parts. The first part considers the educational aspects of nature-study and agriculture; the second, "a detailed topical outline by grades and seasons of the materials used in nature-study in the training school at the

Illinois State Normal University"; the third, "a shorter outline for work in the lower grades arranged according to seasons, and leading more directly to agricultural studies of the seventh and eighth grades"; the fourth "comprises certain chapters upon general topics; material which has been found serviceable for teachers whose general science training has been slight or lacking entirely."

170. *Agriculture for Schools of the Pacific Slope*, E. W. HILGARD and W. J. OSTERHOUT, New York: Macmillan (1910), xix+428.

This book contains twenty-three chapters devoted to plants and their cultivation. Five chapters are devoted to animals. This emphasis on plants is doubtless due to the fact that horticulture is one of the chief agricultural industries of the Pacific Slope. The living plant in all its relations receives more attention than is usual in an agricultural textbook. The book could very well be used as a textbook of botany. It is illustrated by 209 good illustrations.

171. *Domesticated Animals and Plants*, F. DAVENPORT, Boston: Ginn & Co. (1910), xiv+321.

This is a brief treatise upon the origin and development of domestic races with special reference to the methods of improvement. It is in two parts, one "constituting a brief course covering the essential principles that are fundamental to an understanding of hereditary transmission and of the business of plant and animal improvement"; the other deals with the origin of domesticated races.

172. *Farm Development*, WILLETT M. HAYES, New York: Orange Judd Co. (1910), xii+391.

This is "an introductory book in agriculture, including a discussion of soils, selecting and planning farms, subduing the fields, drainage, irrigation, roads, fences, together with introductory chapters concerning farm business, and the relations of the general science of agriculture."

173. *Manual of Agriculture: Soils and Crops*, D. O. BARTO, Boston: D. C. Heath & Co. (1911), xi+492.

This manual is a series of laboratory and field experiments in two parts, one relating to soils; the other to crops. The work included is considered sufficient to cover one year of the high-school course in agriculture, and is intended to "offer training in science comparable to that furnished by the other science courses in good high schools."

174. *Outlines of Agriculture for Rural Schools*, C. M. EVANS, Chicago: W. M. Welch Mfg. Co. (1910), 31.

A year's work is outlined for rural schools with one lesson each week.

175. *Fundamentals of Agriculture*, JAMES EDWARD HALLIGAN, Boston: D. C. Heath & Co. (1911), xi+492.

"Every subject in this book is written by an expert in his line. This idea was carried out in order to furnish the student with the best information that could be obtained. The editor thought it would be better to have authorities treat of the various topics rather than write the book alone, as there are very few men competent enough to warrant their writing the best

book on agriculture." Thirty-three experts in various fields of agriculture have contributed.

176. *An Introduction to Agriculture*, A. A. UPHAM, New York: Appleton & Co. (1911), xi+270.

The aim of the book is "to touch those matters which would be most useful to the pupils in our rural schools, and especially to give the underlying theory for many farm processes and practices." There are twenty-one chapters and an Appendix. All of the usual subjects of agriculture are covered in these chapters, and the Appendix contains references and a number of useful tables.